

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-154699

(43)Date of publication of application : 08.06.1999

(51)Int.Cl.

H01L 21/68
B65D 53/02

(21)Application number : 09-320749

(71)Applicant : SHIN ETSU POLYMER CO LTD

(22)Date of filing : 21.11.1997

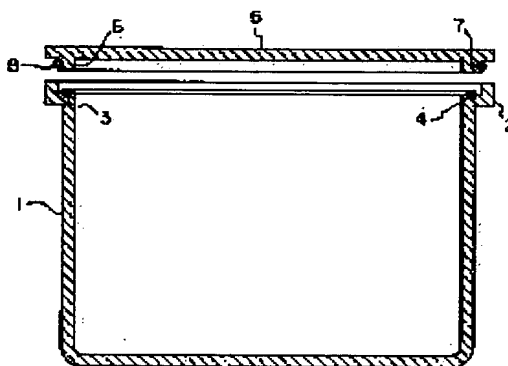
(72)Inventor : OKADA KAZUYA

(54) SEALING STRUCTURE FOR RECEPTACLE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide with a simple structure a receptacle by which sufficient hermetic state can be obtained, even if a base and a lid are made large-sized.

SOLUTION: A base 1 is a cylinder with a bottom and is substantially in the shape of a dome. A protruded part 2 for fitting which is almost L-shaped in cross section is formed from the perimeter of the opening of the base 1. An annular-shaped groove 3 is formed by denting on the inner bottom of the protruded part 2. Also a cylinder 6 for fitting with the protruded part 2 is protruded from the underside of a lid 5. A ring-shaped groove 7 is formed by denting along the perimeter of the fitting cylinder 6. Annular-shaped and solid elastic seals 4 and 8 are fitted in the grooves 3 and 7 to fill the spaces on the perimeter of the base 1 and the lid 5. With this structure, even if the base 1 and the lid 5 are made large-sized adequate hermeticity is ensured.



LEGAL STATUS

[Date of request for examination]

18.11.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

*** NOTICES ***

JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] It is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form. Jut the fitting level difference section of cross-section about L typefaces out of the opening periphery of the above-mentioned base, and even if there is little this fitting level difference section, an endless-like slot is formed in an internal base. Closure structure of the container characterized by preparing the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and blockading the gap in the above-mentioned base and the above-mentioned lid by the elastic seal member of this fitting cylinder part which formed the endless-like slot in the peripheral face at least, and was inserted in the above-mentioned slot, respectively.

[Claim 2] It is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form. Jut the fitting level difference section of cross-section about L typefaces out of the opening periphery of the above-mentioned base, and even if there is little this fitting level difference section, an endless-like slot is formed in an internal base. Prepare the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and the slot of this fitting cylinder part which is endless [-like] is formed in a peripheral face at least. Closure structure of the container characterized by inserting an elastic seal member in two or more above-mentioned slots, respectively, and blockading the gap in the periphery section of the above-mentioned base and the above-mentioned lid by two or more of these elastic seal members.

[Claim 3] It is the container which covers with a lid opening of the base which

presented dome shape mostly in the cylinder-like-object-with-base form. The fitting level difference section of cross-section about L typefaces is juttied out of the opening periphery of the above-mentioned base. Closure structure of the container characterized by blockading the gap in the above-mentioned base and the above-mentioned lid by the elastic seal member which prepared the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, formed the endless-like slot in the base and peripheral face of this fitting cylinder part, respectively, and was inserted in this slot, respectively.

[Claim 4] It is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form. The fitting level difference section of cross-section about L typefaces is juttied out of the opening periphery of the above-mentioned base. Prepare the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and an endless-like slot is formed in the base and peripheral face of this fitting cylinder part, respectively. Closure structure of the container characterized by inserting an elastic seal member in these two or more slots, respectively, and blockading the gap in the periphery section of the above-mentioned base and the above-mentioned lid by two or more of these elastic seal members.

[Claim 5] It is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form. Jut the fitting level difference section of cross-section about L typefaces out of the opening periphery of the above-mentioned base, and an endless-like slot is formed in the internal base and inner skin of this fitting level difference section, respectively. Closure structure of the container characterized by preparing the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and blockading the gap in the above-mentioned base and the above-mentioned lid by the elastic seal member of each above-mentioned slot.

[Claim 6] Claim 3 which really constituted two or more above-mentioned elastic seal members thru/or closure structure of a container given in five.

[Translation done.]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] About the hermetic container for transportation / conveyance of precision components, such as a photo mask, a pellicle, etc. which dislike contamination by dust, dust, etc., this invention protects especially a semi-conductor silicon wafer from contamination, and relates to transportation and the closure structure of the container for conveying.

[0002]

[Description of the Prior Art] For example, although the conventional container which contains a semi-conductor silicon wafer (it is only hereafter called a wafer for short) is not illustrated, it is equipped with the base of the cylinder-like-object-with-base form in which the upper part carried out opening, the alignment inner case for wafers contained by this base, and the lid which covers the opening upper part of a base. And it is conveyed to IC manufacturer by the aircraft, various cars, etc. from chip makers after containing an alignment inner case to a base.

[0003] By the way, since the dwelling engine performance of a seal condition is inadequate when an environmental atmospheric pressure changes by aircraft transportation etc., differential pressure internal and external in a short time is eased comparatively, and the container of the above-mentioned configuration can be opened even if it does not cancel especially a seal condition. However, in this, the dust in atmospheric air will tend to invade into the transportation middle class at a container, and the contamination (contamination) of the wafer which is a contained object will be caused. Then, in view of this point, the container of the seal structure which an elastic seal member is made to be placed between the opening peripheries of a base and a lid, and fits into them is developed.

[0004] In addition, JP,63-82788,U, JP,63-166948,U, JP,8-279546,A, JP,9-107025,A, etc. are raised as advanced-technology reference about this kind of container.

[0005]

[Problem(s) to be Solved by the Invention] However, diameter-ization of macrostomia of a wafer (300mm or more is presumed in the future) progresses in recent years, and the base and lid which contain a wafer in connection with this are also enlarged.

Moreover, it is necessary to make the outer diameter of an elastic seal member correspond to the opening periphery of a base and a lid with the structure of making an elastic seal member placed between the opening peripheries of a base and a lid, and acquiring sealing performance. In this case, since the fitting gap of the opening periphery of a base and a lid and an elastic seal member becomes large with a natural thing, there is a possibility that sufficient sealing performance cannot be acquired.

[0006] This invention was made in view of the above, and even if a base and a lid are enlarged, it aims at offering the closure structure of a container where sealing performance sufficient with a simple configuration can be acquired.

[0007]

[Means for Solving the Problem] It is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form in invention according to claim 1 in order to attain the above-mentioned technical problem. Jut the fitting level difference section of cross-section about L typefaces out of the opening periphery of the above-mentioned base, and even if there is little this fitting level difference section, an endless-like slot is formed in an internal base. It is characterized by preparing the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and blockading the gap in the above-mentioned base and the above-mentioned lid by the elastic seal member of this fitting cylinder part which formed the endless-like slot in the peripheral face at least, and was inserted in the above-mentioned slot, respectively.

[0008] Moreover, it is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form in invention according to claim 2 in order to attain the above-mentioned technical problem. Jut the fitting level difference section of cross-section about L typefaces out of the opening periphery of the above-mentioned base, and even if there is little this fitting level difference section, an endless-like slot is formed in an internal base. Prepare the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and the slot of this fitting cylinder part which is endless

[—like] is formed in a peripheral face at least. It is characterized by inserting an elastic seal member in two or more above-mentioned slots, respectively, and blockading the gap in the periphery section of the above-mentioned base and the above-mentioned lid by two or more of these elastic seal members.

[0009] Moreover, it is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form in invention according to claim 3 in order to attain the above-mentioned technical problem. The fitting level difference section of cross-section about L typefaces is juttred out of the opening periphery of the above-mentioned base. The fitting cylinder part which fits into this fitting level difference section is prepared in the rear face of the above-mentioned lid, an endless-like slot is formed in the base and peripheral face of this fitting cylinder part, respectively, and it is characterized by blockading the gap in the above-mentioned base and the above-mentioned lid by the elastic seal member inserted in this slot, respectively.

[0010] Moreover, it is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form in invention according to claim 4 in order to attain the above-mentioned technical problem. The fitting level difference section of cross-section about L typefaces is juttred out of the opening periphery of the above-mentioned base. Prepare the fitting cylinder part which fits into this fitting level difference section in the rear face of the above-mentioned lid, and an endless-like slot is formed in the base and peripheral face of this fitting cylinder part, respectively. It is characterized by inserting an elastic seal member in these two or more slots, respectively, and blockading the gap in the periphery section of the above-mentioned base and the above-mentioned lid by two or more of these elastic seal members.

[0011] Moreover, it is the container which covers with a lid opening of the base which presented dome shape mostly in the cylinder-like-object-with-base form in invention according to claim 5 in order to attain the above-mentioned technical problem. Jut the fitting level difference section of cross-section about L typefaces out of the opening periphery of the above-mentioned base, and an endless-like slot is formed in the internal base and inner skin of this fitting level difference section, respectively. The fitting cylinder part which fits into this fitting level difference section is prepared in the rear face of the above-mentioned lid, and it is characterized by blockading the gap in the above-mentioned base and the above-mentioned lid by the elastic seal member of each above-mentioned slot. In addition, two or more above-mentioned elastic seal members can also really be constituted.

[0012] Here, the closure structure of the container concerning this invention puts a lid on opening of a base, closes these periphery sections, and is aimed at the container which can seal the interior. There is no trouble between these bases and a lid in closing motion of a lid, and the optimal gap which can close the level difference section of a base and the fitting cylinder part of a lid is needed. Although the quality of the material of an elastic sheet member, a configuration, the amount of crushing, and the closure force of a lid over the base at the time of reaching or taking up a gap are taken into consideration and it is determined, if there is 0.01mm or more of this gap, it is enough practical. Specifically, it considers as the proper gap chosen from the range of 0.003mm or more – 5mm.

[0013] A container puts a lid on opening of a base, and fixes these periphery sections by the stop member, and the closure is carried out by making an elastic seal member deform and taking up the gap of a base and a lid. This closure is canceled by removing a lid up etc. using a rib, a handle, etc. of a lid. In addition, although the method of containing a contained object to a base and putting a lid on it is common, it is not limited to this. For example, as a contained object may be contained on the base of a lid, a base may be set to opening of a lid, and the gap of the fitting cylinder part of a lid and the fitting level difference section of a base may be closed and stuck. Moreover, "the base which presented dome shape mostly" in a claim means the base of the hollow which presented various configurations, such as not only a semicircle globular form but a closed-end cylindrical shape, and a prism form.

[0014] The similar configuration about accepted to be a cross-section L typeface besides the cross-section L typeface of strict semantics is also included in "cross-section about L typefaces." Moreover, specifically, a slot is formed in each field indicated to the claim the shape of annular and endless, in the shape of a frame, etc. endless. Although a slot is formed in each above-mentioned field at worst, if further formed in the inner skin of the fitting level difference section of a base, the base of the fitting cylinder part of a lid, or the internal base and inner skin of the fitting level difference section of a base, it will do the stop effectiveness of a lid so with the sealing performance inside a container. That is, if it fits in and sticks to the slot of each above-mentioned field where the elastic seal member which bulges from the internal base of the fitting level difference section of a base, the peripheral face of the fitting cylinder part of a lid, or the base and peripheral face of a fitting cylinder part of a lid corresponds, it is hard coming to separate a lid from a base, and, in addition to the closure effectiveness, more positive stop immobilization can be expected.

[0015] Although especially an elastic seal member does not limit the configuration,

structure, etc., its structure of hollow or a solid is [endlessly] desirable. Since especially a tube-like elastic seal member can make compressive force low geometrically even when the degree of hardness of the quality of the material itself is comparatively high, it is very effective. Moreover, it is important for an elastic seal member that it is the quality of the material which is rich in flexibility or resiliency from a viewpoint of the compressibility inside a container or sealing nature. As such the quality of the material, the rubber of thermoplastic elastomer and a fluororesin system or various kinds of rubber material correspond. By the rubber degree of hardness, since the compression set is small, especially silicone rubber of 40 or less degrees can be called desirable quality of the material.

[0016] In addition, although it is common to use it as for two elastic seal members, it is also possible to use three or more pieces and to raise sealing performance further. When [this] using more than one, as long as it is possible, two or more elastic seal members may be unified. Furthermore, the configuration which may be inserted in a slot at the time of an activity, and was beforehand fixed to the slot through adhesives, a binder, etc. is sufficient as an elastic seal member.

[0017]

[Embodiment of the Invention] Hereafter, the 1st operation gestalt of this invention is explained with reference to a drawing. He is trying for the container in this operation gestalt to cover the opening upper part of a base 1 with a lid 5 detachably, as shown in drawing 1 or drawing 2 .

[0018] A base 1 is fabricated by transparent closed-end cylindrical shape and dome shape using synthetic resin excellent in a mechanical property, stain resistance, and a moldability, and functions as containing the alignment inner case for wafers which is not illustrated. Stretch forming of the fitting level difference section 2 of a cross-section **** stairway form is carried out to the periphery of the opening upper part of this base 1 at a level with the direction of the outside of a radius, in the internal base (horizontal plane) of this fitting level difference section 2, the slot 3 of a cross-section hemicycle is dented annularly, it is fabricated, and fitting wearing of the attachment and detachment of the elastic seal 4 of a solid is enabled [annularly and] in this slot 3. This elastic seal 4 carries out insertion contact at that surface lower fang furrow 3, and the remainder bulges. In addition, although it does not illustrate, an alignment inner case is fabricated by the cylindrical shape in the air, puts the wafer of a level condition in order in the vertical direction through a clearance, and carries out two or more (for example, 25 sheets) receipt.

[0019] A lid 5 is fabricated by the disk type using synthetic resin excellent in a

mechanical property, stain resistance, and a moldability, and protrusion shaping of the fitting cylinder part 6 of diameter reduction is carried out a little towards down [of drawing 1] in the ring form from the rear face. In the peripheral face (vertical plane) of this fitting level difference section 2, the slot 7 of a cross-section hemicycle is dented annularly, it is fabricated, and fitting wearing of the attachment and detachment of the elastic seal 8 of a solid is enabled [annularly and] in this slot 7. This elastic seal 8 carries out insertion contact at that front-face 1 side fang furrow 7, and the remainder bulges.

[0020] What is necessary is to put a lid 5 on the opening upper part of a base 1, to fit into it, and just to fix in the above-mentioned configuration, respectively by two or more pieces of a stop which do not illustrate the periphery edge of these, in order to close a container. Then, the elastic seal 4-8 of a pair carries out press deformation, respectively, the gap of the internal base of the fitting level difference section 2 and the peripheral face of the fitting cylinder part 6 is blockaded completely, and the interior of a container is sealed.

[0021] Since according to the above-mentioned configuration the elastic seal 4-8 carries out a compression set, respectively and blockades completely the gap of the fitting level difference section 2 and the fitting cylinder part 6, even if a wafer is set to 300mm or more and a base 1 and a lid 5 are enlarged, sufficient sealing performance can be acquired.

[0022] In addition, although this operation gestalt shows what carries out fitting wearing of the elastic seal 8 for the elastic seal 4 in a slot 7, respectively to a slot 3 at the time of an activity, it is not limited to this at all. For example, it is good also as a configuration which carried out fitting adhesion of the elastic seal 4-8 beforehand before the activity in the slot 3-7.

[0023] Drawing 3 and drawing 4 are what shows the 2nd operation gestalt of this invention. Next, in this case Omit the slot 3 of the fitting level difference section 2, and the slot 9-10 of a cross-section hemicycle is dented and fabricated annular, respectively to the base (horizontal plane) and peripheral face (vertical plane) in the fitting cylinder part 6 of a lid 5. Enable fitting wearing of the attachment and detachment of the elastic seal 11-12 of annular and a solid into each slot 9-10, and he is trying to blockade the gap in the periphery edge of a base 1 and a lid 5 with two or more elastic seals 11-12. About other parts, since it is the same as that of the above-mentioned operation gestalt, explanation is omitted. Also in this operation gestalt, it is clear that the same operation effectiveness as the above-mentioned operation gestalt is expectable.

[0024] In addition, although this operation gestalt shows what carries out fitting wearing of the elastic seal 12 for the elastic seal 11 in a slot 10, respectively to a slot 9 at the time of an activity, it is not limited to this at all. For example, it is good also as a configuration which carried out fitting adhesion of the elastic seal 11-12 beforehand before the activity in the slot 9-10. Moreover, although what uses separately two elastic seals 11-12 with which magnitude differs was shown, two elastic seals 11-12 are really fabricated, and you may make it attain simplification, as shown in drawing 5. Thus, if it really fabricates, there will be no fear of loss of the elastic seal 11-12, and, moreover, it will become reducible [components mark].

[0025] Next, drawing 6 and drawing 7 show the 3rd operation gestalt of this invention, and in this case, although the fundamental configuration is the same as that of drawing 1 or drawing 2 While denting and fabricating the slot 13-14 of a cross-section hemicycle annular, respectively to the internal base (horizontal plane) and inner skin (vertical plane) in the fitting level difference section 2 of a base 1 The slot 15-16 of a cross-section hemicycle is dented and fabricated annular, respectively to the base (horizontal plane) and peripheral face (vertical plane) in the fitting cylinder part 6 of a lid 5. Enable fitting wearing of the attachment and detachment of the elastic seal 17-18 of annular and a solid into each slot 13-16, and he is trying to blockade the gap in the periphery edge of a base 1 and a lid 5 with two or more elastic seals 17-18. Therefore, as for the slot 14 of a base 1, the slot 15 of a lid 5 holds the elastic seal 13 of a base 1 for the elastic seal 18 of a lid 5 in the state of tight fitting, respectively. About other parts, since it is the same as that of the above-mentioned operation gestalt, explanation is omitted.

[0026] Also in this operation gestalt, the same operation effectiveness as the above-mentioned operation gestalt is expectable, moreover, since the elastic seal 17-18 inserts completely and it is stuck to it in a slot 13-14-15-16, while the interior of a container is sealed certainly firmly, it is very hard coming to separate a lid 5 from a base 1, and stop immobilization of a lid 5 becomes more certain.

[0027] In addition, reverse is sufficient although the above-mentioned operation gestalt showed what was dented in the base and peripheral face of the fitting cylinder part 6, respectively, fabricated the slot 15-16 to them, and omitted the slot of the fitting level difference section 2 of a base 1. That is, the slot 15-16 of the fitting cylinder part 6 of a lid 5 is omitted, and it dents only in the fitting level difference section 2 of a base 1, respectively, and you may make it fabricate a slot 13-14 in it. Moreover, two elastic seals with which magnitude differs in this case can really be fabricated, and simplification can be attained. Moreover, although the

above-mentioned operation gestalt showed the container for wafers, it is not limited to this at all. For example, you may make it contain directly indirectly the electrical and electric equipment, an electron or the aluminum disk used in the manufacture field of a semi-conductor, a liquid crystal cell, quartz glass, or a mask substrate in a container. Furthermore, you may make it contain the contained object of other fields other than the above-mentioned field.

[0028]

[Effect of the Invention] As mentioned above, according to invention claim 1 thru/or given in five, even if a base and a lid are enlarged, it is effective in the ability to acquire sealing performance sufficient with a simple configuration. Furthermore, according to invention according to claim 6, management and storage of an elastic seal member become easy, and, moreover, it becomes possible to reduce components mark.

[Translation done.]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section explanatory view showing the condition in front of the closure in the operation gestalt of the closure structure of the container concerning this invention.

[Drawing 2] It is the cross-section explanatory view showing the condition after the closure in the operation gestalt of the closure structure of the container concerning this invention.

[Drawing 3] It is the cross-section explanatory view showing the condition in front of the closure in the 2nd operation gestalt of the closure structure of the container concerning this invention.

[Drawing 4] It is the cross-section explanatory view showing the condition after the closure in the 2nd operation gestalt of the closure structure of the container concerning this invention.

[Drawing 5] It is the top view showing other examples of the elastic seal in the operation gestalt of the closure structure of the container concerning this invention.

[Drawing 6] It is the cross-section explanatory view showing the condition in front of the closure in the 3rd operation gestalt of the closure structure of the container concerning this invention.

[Drawing 7] It is the cross-section explanatory view showing the condition after the closure in the 3rd operation gestalt of the closure structure of the container concerning this invention.

[Description of Notations]

1 Base

2 Fitting Level Difference Section

3 Slot

- 4 Elastic Seal (Elastic Seal Member)
- 5 Lid
- 6 Fitting Cylinder Part
- 7 Slot
- 8 Elastic Seal (Elastic Seal Member)
- 9 Slot
- 10 Slot
- 11 Elastic Seal (Elastic Seal Member)
- 12 Elastic Seal (Elastic Seal Member)
- 13 Slot
- 14 Slot
- 15 Slot
- 16 Slot
- 17 Elastic Seal (Elastic Seal Member)
- 18 Elastic Seal (Elastic Seal Member)

[Translation done.]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law

[Section partition] The 2nd partition of the 7th section

[Publication date] November 11, Heisei 16 (2004. 11.11)

[Publication No.] JP,11-154699,A

[Date of Publication] June 8, Heisei 11 (1999. 6.8)

[Application number] Japanese Patent Application No. 9-320749

[The 7th edition of International Patent Classification]

H01L 21/68

B65D 53/02

[FI]

H01L 21/68 T

B65D 53/02

[Procedure revision]

[Filing Date] November 18, Heisei 15 (2003. 11.18)

[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] Whole sentence

[Method of Amendment] Modification

[The contents of amendment]

[Title of the Invention] Hermetic container

[Claim(s)]

[Claim 1] It is the hermetic container which covers opening of a base in the air with a cylinder-like-object-with-base form with a lid,

Two or more elastic seal members which intervene between the fitting level difference section jutted out of the opening periphery of a base outside, and this fitting level difference section and the periphery section of a lid, and blockade between these in a duplex are included,

The hermetic container characterized by equipping the outside of the elastic seal member of one with other elastic seal members among two or more elastic seal members, and carrying out the seal of the lock out part of the elastic seal member of 1 by other elastic seal members.

[Claim 2] The hermetic container according to claim 1 which equips the rear-face periphery section of a lid with the fitting cylinder part which fits into fitting level difference circles, inserts the elastic seal member of 1 in the inner base of the fitting level difference section through a slot, and inserted other elastic seal members in the peripheral face of a fitting cylinder part through the slot.

[Claim 3] The hermetic container according to claim 1 which was equipped with the fitting cylinder part which fits into fitting level difference circles, attached the elastic seal member of 1 in the base of this fitting cylinder part, and attached other elastic seal members in the rear-face periphery section of a lid at the peripheral face of a fitting cylinder part.

[Claim 4] While equipping the rear-face periphery section of a lid with the fitting cylinder part which fits into fitting level difference circles and inserting the elastic seal member of 1 in the base of this fitting cylinder part through a slot The hermetic container according to claim 1 to which other elastic seal members were inserted in the peripheral face of a fitting cylinder part through the slot, and the elastic seal member of these 1 and other elastic seal members are contacted to the fitting level difference circles of a base, and were made to carry out a compression set at the time of covering of a lid.

[Claim 5] While equipping the rear-face periphery section of a lid with the fitting cylinder part which fits into fitting level difference circles and forming a slot in the inner base and inner skin of the fitting level difference section, respectively The hermetic container according to claim 1 which forms a slot in the base and peripheral face of a fitting cylinder part, respectively, inserts in the inner base of the fitting level difference section the elastic seal member of 1 which gets into the slot of the base of a fitting cylinder part, and inserted in the slot of the peripheral face of a fitting cylinder part other elastic seal members which get into the slot of the inner skin of the fitting

level difference section.

[Claim 6] claim 1 which two or more elastic seal members are formed in endless, respectively, and magnitude was changed, inserted other elastic seal members in the outside of the elastic seal member of 1 through the clearance, and really constituted these thru/or 5 — a hermetic container given in either.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

About the hermetic container for transportation / conveyance of precision components, such as a photo mask, a pellicle, etc. which dislike contamination by dust, dust, etc., this invention protects especially a semi-conductor silicon wafer from contamination, and relates to transportation and the hermetic container for conveying.

[0002]

[Description of the Prior Art]

Although the conventional container which contains a semi-conductor silicon wafer (it is only hereafter called a wafer for short) is not illustrated, it is equipped with the base of the cylinder-like-object-with-base form in which the upper part carried out opening, the alignment inner case for wafers contained by this base, and the lid which covers the opening upper part of a base. And after an alignment inner case is contained by the base, it is conveyed to IC manufacturer by the aircraft, various cars, etc. from chip makers.

[0003]

By the way, since the dwelling engine performance of a seal condition is inadequate when an atmospheric pressure changes by aircraft transportation etc., differential pressure internal and external in a short time is eased comparatively, and the container of the above-mentioned configuration can be opened even if it does not cancel especially a seal condition.

However, in this, the dust in atmospheric air will tend to invade into the transportation middle class at a container, and the contamination (contamination) of the wafer which is a contained object will be caused.

Then, in view of this point, the container of the seal structure which an elastic seal member is made to intervene between a base and a lid, and fits into it is developed.

[0004]

In addition, JP,63-82788,U, JP,63-166948,U, JP,8-279546,A, JP,9-107025,A, etc. are raised as advanced-technology reference about this kind of container.

[0005]

[Problem(s) to be Solved by the Invention]

However, diameter-ization of macrostomia of a wafer (300mm or more is presumed in the future) progresses in recent years, and the base and lid which contain a wafer are also enlarged in connection with this.

Moreover, it is necessary to make the outer diameter of an elastic seal member correspond to the periphery of a base and a lid with the structure of making an elastic seal member intervening between a base and a lid, and acquiring sealing performance. In this case, since the fitting gap of the periphery of a base and a lid and an elastic seal member becomes large with a natural thing, there is a possibility that sufficient sealing performance cannot be acquired.

[0006]

Even if this invention was made in view of the above and a base and a lid enlarge it, it aims at offering the hermetic container which can acquire sealing performance sufficient with a simple configuration.

[0007]

[Means for Solving the Problem]

In this invention, in order to attain the above-mentioned technical problem, a lid covers opening of a base in the air in a cylinder-like-object-with-base form, Two or more elastic seal members which intervene between the fitting level difference section jutted out of the opening periphery of a base outside, and this fitting level difference section and the periphery section of a lid, and blockade between these in a duplex are included,

The outside of the elastic seal member of one is equipped with other elastic seal members among two or more elastic seal members, and it is characterized by carrying out the seal of the lock out part of the elastic seal member of 1 by other elastic seal members.

[0008]

In addition, the rear-face periphery section of a lid is equipped with the fitting cylinder part which fits into fitting level difference circles, the elastic seal member of 1 is inserted in the inner base of the fitting level difference section through a slot, and other elastic seal members can be inserted in the peripheral face of a fitting cylinder part through a slot.

[0009]

Moreover, it has the fitting cylinder part which fits into fitting level difference circles, and the elastic seal member of 1 can be attached in the base of this fitting cylinder part, and other elastic seal members can be attached in the rear-face periphery

section of a lid at the peripheral face of a fitting cylinder part.

[0010]

Moreover, while inserting in the elastic seal member of 1 through a slot, other elastic seal members are inserted in the peripheral face of a fitting cylinder part through a slot, and the base of this fitting cylinder part can be contacted to the fitting level difference circles of a base, and can be made to equip the rear-face periphery section of a lid with the fitting cylinder part which fits into fitting level difference circles, and to carry out the compression set of the elastic seal member of these 1, and other elastic seal members to it at the time of covering of a lid.

[0011]

Moreover, while equipping the rear-face periphery section of a lid with the fitting cylinder part which fits into fitting level difference circles and forming a slot in the inner base and inner skin of the fitting level difference section, respectively A slot is formed in the base and peripheral face of a fitting cylinder part, respectively, the elastic seal member of 1 which gets into the slot of the base of a fitting cylinder part is inserted in the inner base of the fitting level difference section, and other elastic seal members which get into the slot of the inner skin of the fitting level difference section can be inserted in the slot of the peripheral face of a fitting cylinder part. Furthermore, two or more elastic seal members are formed in endless, respectively, magnitude is changed, other elastic seal members are inserted in the outside of the elastic seal member of 1 through a clearance, and these can also really be constituted.

[0012]

Here, the hermetic container in a claim puts a lid on opening of a base, closes these periphery sections, and is aimed at the container which can seal the interior. Between these bases and a lid, there is no trouble in closing motion of a lid, and the optimal gap which can close the fitting level difference section of a base and the fitting cylinder part of a lid is needed. Although the quality of the material of an elastic seal member, a configuration, the amount of crushing, and the closure force of a lid over the base at the time of reaching or taking up a gap are taken into consideration and it is determined, if there is 0.01mm or more of this gap, it is enough practical. Specifically, it is chosen from the range of 0.003mm or more – 5mm.

[0013]

A hermetic container puts a lid on opening of a base, and fixes these periphery sections by the stop member, and the closure is carried out by making an elastic seal member deform and taking up the gap of a base and a lid. This closure uses a rib, a handle, etc. of a lid and is canceled by removing a lid up etc. Thus, although the

closure of a hermetic container has a common method of containing a contained object to a base and putting a lid on it, it is not limited to this. Moreover, "it is a base in the air in a cylinder-like-object-with-base form" means the base of the hollow which presented various configurations, such as not only a semicircle globular form but a closed-end cylindrical shape, and a prism form.

[0014]

Although the fitting level difference section is mainly formed in cross-section about L typefaces, the similar configuration about accepted to be a cross-section L typeface besides the cross-section L typeface of strict semantics is included in these "cross-section about L typefaces." Moreover, specifically, a slot is formed in each field indicated to the claim the shape of annular and endless, in the shape of a frame, etc. endless. Although this slot is formed in each above-mentioned field at worst, if further formed in the inner skin of the fitting level difference section of a base, the base of the fitting cylinder part of a lid, or the inner base and inner skin of the fitting level difference section of a base, it will do the stop effectiveness of a lid so with the sealing performance inside a container. That is, if it fits in and sticks to the slot of each above-mentioned field where the elastic seal member which bulges from the inner base of the fitting level difference section of a base, the peripheral face of the fitting cylinder part of a lid, or the base and peripheral face of a fitting cylinder part of a lid corresponds, it is hard coming to separate a lid from a base, and, in addition to the closure effectiveness, more positive stop immobilization can be expected.

[0015]

Especially two or more elastic seal members have [endlessly] the desirable structure of hollow or a solid, although the configuration, structure, etc. are not limited. Since especially a tube-like elastic seal member can make compressive force low geometrically even when the degree of hardness of the quality of the material itself is comparatively high, it is very effective. It is important for an elastic seal member that it is the quality of the material which is rich in flexibility or resiliency from a viewpoint of the compressibility inside a hermetic container or sealing nature. As such the quality of the material, the rubber of thermoplastic elastomer and a fluororesin system or various kinds of rubber material are raised. By the rubber degree of hardness, since the compression set is small, especially silicone rubber of 40 or less degrees can be called desirable quality of the material.

[0016]

In addition, although it is common to use it as for two elastic seal members, it is also possible to use three or more pieces and to raise sealing performance further. If

possible when using two or more elastic seal members, two or more elastic seal members can be unified. Furthermore, the configuration which may be inserted in a slot at the time of an activity, and is beforehand fixed to a slot through adhesives, a binder, etc. is sufficient as an elastic seal member.

[0017]

[Embodiment of the Invention]

Hereafter, if the desirable operation gestalt of this invention is explained with reference to a drawing, the hermetic container in this operation gestalt The lid 5 which covers detachably the opening upper part of the base 1 of dome shape, and this base 1 as shown in drawing 1 or drawing 2, It has two or more elastic seals 4-8 which intervene between the fitting level difference section 2 juttred out from the opening periphery of a base 1, and this fitting level difference section 2 and the periphery section of a lid 5, and blockade between these fitting level difference section 2 and the periphery sections of a lid 5 in a duplex. The magnitude of two or more of these elastic seals 4-8 is changed mutually, the elastic seal 8 is arranged on the outside of the elastic seal 4, and it is made to carry out the seal of the lock out part of the elastic seal 4 with the elastic seal 8 from an upper part outside.

[0018]

A base 1 is fabricated by the transparent closed-end cylindrical shape using the synthetic resin which is excellent in a mechanical property, stain resistance, and a moldability, and functions as containing the alignment inner case for wafers which is not illustrated. Stretch forming of the fitting level difference section 2 of a cross-section **** stairway form is carried out at a level with the direction of the outside of a radius, and in the periphery of the opening upper part of this base 1, the slot 3 of a cross-section hemicycle is dented annularly, it is fabricated by the inner base (horizontal plane) of this fitting level difference section 2 in it, and fitting wearing of the attachment and detachment of the elastic seal 4 of a solid is enabled [annularly and] in this slot 3. This elastic seal 4 carries out insertion contact at that surface lower fang furrow 3, and the remainder bulges.

In addition, although it does not illustrate, an alignment inner case is fabricated by the cylindrical shape in the air, puts the wafer of a level condition in order in the vertical direction through a clearance, and carries out two or more (for example, 25 sheets) receipt.

[0019]

A lid 5 is fabricated by the disk type using synthetic resin excellent in a mechanical property, stain resistance, and a moldability, protrusion shaping of the fitting cylinder

part 6 of diameter reduction is carried out a little towards down [of drawing 1] in the ring form from that rear-face periphery section, and this fitting cylinder part 6 fits in in the fitting level difference section 2 of a base 1. In the peripheral face (vertical plane) of the fitting cylinder part 6, the slot 7 of a cross-section hemicycle is dented annularly, it is fabricated, and fitting wearing of the attachment and detachment of the elastic seal 8 of a solid is enabled [annularly and] in this slot 7. This elastic seal 8 is formed more greatly than the elastic seal 4, it is located in that outside, insertion contact is carried out at the front-face 1 side fang furrow 7, and the remainder bulges. [0020]

What is necessary is to put a lid 5 on the opening upper part of a base 1, to fit into it, and just to fix in the above-mentioned configuration, by two or more pieces of a stop which do not illustrate these peripheries, respectively, in order to close a hermetic container. Then, while the elastic seal 4 contacts the base of the fitting cylinder part 6 and carries out press deformation, the elastic seal 8 contacts the inner skin of the fitting level difference section 2, and carries out press deformation, the gap of the fitting level difference section 2 and the fitting cylinder part 6 is blockaded doubly and completely, and the interior of a hermetic container is sealed. [0021]

Since according to the above-mentioned configuration the elastic seal 4 is inserted in the inner base of the fitting level difference section 2 through a slot 3 and the elastic seal 8 is inserted in the peripheral face of the fitting cylinder part 6 through a slot 7, the elastic seal 4-8 which performs duplex sealing machine ability carries out a compression set, respectively, and blockades completely the gap of the fitting level difference section 2 and the fitting cylinder part 6. Therefore, even if a wafer is set to 300mm or more and a base 1 and a lid 5 are enlarged, sufficient sealing performance can be acquired. [0022]

In addition, although this operation gestalt shows what carries out fitting wearing of the elastic seal 8 which carries out the seal of the elastic seal 4 for the elastic seal 4 to a slot 7 from the outside in a slot 3, respectively at the time of an activity, it is not limited to this at all. For example, it is good also as a configuration which carried out fitting adhesion of the elastic seal 4-8 beforehand before the activity in the slot 3-7. [0023]

Drawing 3 and drawing 4 are what shows the 2nd operation gestalt of this invention. Next, in this case While inserting the elastic seal 11 in the base of the fitting cylinder part 6 of a lid 5 through a slot 9 The elastic seal 12 is inserted in the peripheral face of

the fitting cylinder part 6 through a slot 10, and at the time of covering of a lid 5, these elastic seal 11-12 is contacted in the fitting level difference section 2 of a base 1, and is made to carry out a compression set.

[0024]

If it puts in another way, will omit the slot 3 of the fitting level difference section 2, and to the base (horizontal plane) and peripheral face (vertical plane) in the fitting cylinder part 6 of a lid 5 The slot 9-10 of a cross-section hemicycle is dented and fabricated to annular, respectively, and enable fitting wearing of the attachment and detachment of the elastic seal 11-12 of annular and a solid, and he is trying to blockade the gap in the periphery of a base 1 and a lid 5 in a duplex with two or more elastic seals 11-12 in each slot 9-10. About other parts, since it is the same as that of the above-mentioned operation gestalt, explanation is omitted.

Also in this operation gestalt, it is clear that the same operation effectiveness as the above-mentioned operation gestalt is expectable.

[0025]

In addition, although this operation gestalt shows what carries out fitting wearing of the elastic seal 12 which carries out the seal of the elastic seal 11 for the elastic seal 11 to a slot 10 from the outside in a slot 9, respectively at the time of an activity, it is not limited to this at all. For example, it is good also as a configuration which carried out fitting adhesion of the elastic seal 11-12 beforehand before the activity in the slot 9-10.

[0026]

Moreover, although what uses separately two elastic seals 11-12 with which magnitude differs was shown, two elastic seals 11-12 are formed in the ring form where size magnitude differs, respectively, it arranges at a concentric circle, these two elastic seals 11-12 are really fabricated, and you may make it attain simplification, as shown in drawing 5. Thus, if it really fabricates, there will be no fear of loss of the elastic seal 11-12, and, moreover, it will become reducible [components mark].

[0027]

Next, although drawing 6 and drawing 7 show the 3rd operation gestalt of this invention and the fundamental configuration is the same as that of drawing 1 or drawing 2 in this case While denting and fabricating the slot 13-14 of a cross-section hemicycle annular, respectively to the inner base (horizontal plane) and inner skin (vertical plane) in the fitting level difference section 2 of a base 1 To the base (horizontal plane) and peripheral face (vertical plane) in the fitting cylinder part 6 of a lid 5 The slot 15-16 of a cross-section hemicycle is dented and fabricated to annular,

respectively, and enable fitting wearing of the attachment and detachment of the elastic seal 17-18 of annular and a solid, and he is trying to blockade the gap in the periphery of a base 1 and a lid 5 in a duplex with two or more elastic seals 17-18 in each slot 13-16.

[0028]

Therefore, as for the slot 14 of a base 1, the slot 15 of a lid 5 holds the elastic seal 17 of a base 1 for the elastic seal 18 of a lid 5 in the state of tight fitting, respectively. About other parts, since it is the same as that of the above-mentioned operation gestalt, explanation is omitted.

[0029]

Also in this operation gestalt, the same operation effectiveness as the above-mentioned operation gestalt is expectable, moreover, since the elastic seal 17-18 inserts completely and it is stuck to it in a slot 13-14-15-16, while the interior of a hermetic container is sealed certainly firmly, it is very hard coming to separate a lid 5 from a base 1, and stop immobilization of a lid 5 becomes more certain.

[0030]

In addition, reverse is sufficient although the above-mentioned operation gestalt showed what was dented in the base and peripheral face of the fitting cylinder part 6, respectively, fabricated the slot 15-16 to them, and omitted the slot of the fitting level difference section 2 of a base 1. That is, the slot 15-16 of the fitting cylinder part 6 of a lid 5 is omitted, and it dents only in the fitting level difference section 2 of a base 1, respectively, and you may make it fabricate a slot 13-14 in it. In this case, two elastic seals with which magnitude differs can really be fabricated, and simplification can be attained.

[0031]

Moreover, although the above-mentioned operation gestalt showed the hermetic container for wafers, it is not limited to this at all. For example, you may make it contain directly indirectly the electrical and electric equipment, an electron or the aluminum disk used in the manufacture field of a semi-conductor, a liquid crystal cell, quartz glass, or a mask substrate to a hermetic container. Furthermore, it is also possible to contain the contained object of other fields other than the above-mentioned field.

[0032]

[Effect of the Invention]

According to this invention, it is effective in the ability to acquire sealing performance sufficient with a simple configuration by the double seal of the elastic seal member of

1, and other elastic seal members, even if a base and a lid are enlarged as mentioned above.

Moreover, if form two or more elastic seal members in endless, respectively, magnitude is changed, other elastic seal members are inserted in the outside of the elastic seal member of 1 through a clearance and these are really constituted, two or more managements and storage of an elastic seal member will become easy, and it will become possible to reduce components mark.

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section explanatory view showing the condition in front of the closure in the operation gestalt of the hermetic container concerning this invention.

[Drawing 2] It is the cross-section explanatory view showing the condition after the closure in the operation gestalt of the hermetic container concerning this invention.

[Drawing 3] It is the cross-section explanatory view showing the condition in front of the closure in the 2nd operation gestalt of the hermetic container concerning this invention.

[Drawing 4] It is the cross-section explanatory view showing the condition after the closure in the 2nd operation gestalt of the hermetic container concerning this invention.

[Drawing 5] It is the top view showing other examples of the elastic seal in the operation gestalt of the hermetic container concerning this invention.

[Drawing 6] It is the cross-section explanatory view showing the condition in front of the closure in the 3rd operation gestalt of the hermetic container concerning this invention.

[Drawing 7] It is the cross-section explanatory view showing the condition after the closure in the 3rd operation gestalt of the hermetic container concerning this invention.

[Description of Notations]

1 Base

2 Fitting Level Difference Section

3 Slot

4 Elastic Seal (Elastic Seal Member of 1)

5 Lid

6 Fitting Cylinder Part

7 Slot

8 Elastic Seal (Other Elastic Seal Members)

- 9 Slot**
- 10 Slot**
- 11 Elastic Seal (Elastic Seal Member of 1)**
- 12 Elastic Seal (Other Elastic Seal Members)**
- 13 Slot**
- 14 Slot**
- 15 Slot**
- 16 Slot**
- 17 Elastic Seal (Elastic Seal Member of 1)**
- 18 Elastic Seal (Other Elastic Seal Members)**

[Translation done.]

(19)日本国特許庁 (J P)

(12) 公 開 特 許 公 報 (A)

(11)特許出願公開番号

特開平11-154699

(43)公開日 平成11年(1999)6月8日

(51)IntCl.⁵

識別記号

F I

H 0 1 L 21/68

H 0 1 L 21/68

T

B 6 5 D 53/02

B 6 5 D 53/02

審査請求 未請求 請求項の数6 O L (全 6 頁)

(21)出願番号 特願平9-320749

(22)出願日 平成9年(1997)11月21日

(71)出願人 000190116

信越ポリマー株式会社

東京都中央区日本橋本町4丁目3番5号

(72)発明者 岡田 一也

新潟県糸魚川市大字大和川715 新潟ポリ

マー株式会社内

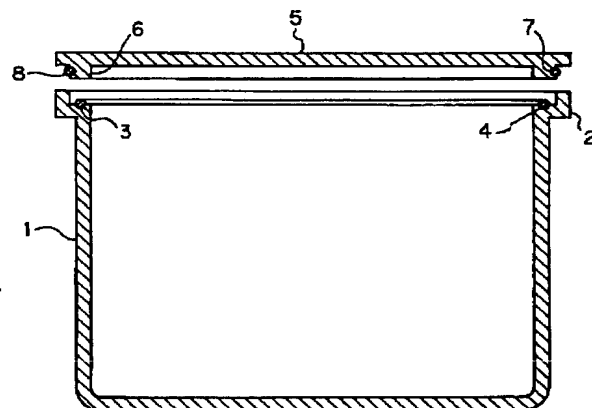
(74)代理人 弁理士 藤本 博光 (外2名)

(54)【発明の名称】 容器の封止構造

(57)【要約】

【課題】 基体と蓋体とが大型化しても簡易な構造で十分な密封性を得ることができる容器を提供する。

【解決手段】 有底筒形でほぼドーム形を呈した基体1の開口部周縁から断面ほぼL字形の嵌合段差部2を外方向に張り出し成形してこの嵌合段差部2の内部底面には環状の溝3を凹み成形する。また、蓋体5の裏面から嵌合段差部2に嵌合する嵌合筒部6を突出させてこの嵌合筒部6の外周面には環状の溝7を凹み成形し、複数の溝3・7に環状・中実の弾性シール4・8をそれぞれ嵌入してこの複数の弾性シール4・8で基体1と蓋体5との外周部における間隙を閉塞する。この構造により、例えば基体1と蓋体5が大型化されても、十分な密封性を確保できる。



【特許請求の範囲】

【請求項 1】 有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼ L 字形の嵌合段差部を張り出してこの嵌合段差部の少なくとも内部底面には無端状の溝を形成し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の少なくとも外周面には無端状の溝を形成し、上記溝にそれぞれ嵌入された弾性シール部材で上記基体と上記蓋体における間隙を閉塞することを特徴とする容器の封止構造。

【請求項 2】 有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼ L 字形の嵌合段差部を張り出してこの嵌合段差部の少なくとも内部底面には無端状の溝を形成し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の少なくとも外周面には無端状の溝を形成し、上記複数の溝に弾性シール部材をそれぞれ嵌入してこの複数の弾性シール部材で上記基体と上記蓋体との外周部における間隙を閉塞することを特徴とする容器の封止構造。

【請求項 3】 有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼ L 字形の嵌合段差部を張り出し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の底面と外周面とには無端状の溝をそれぞれ形成し、この溝にそれぞれ嵌入された弾性シール部材で上記基体と上記蓋体における間隙を閉塞することを特徴とする容器の封止構造。

【請求項 4】 有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼ L 字形の嵌合段差部を張り出し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の底面と外周面とには無端状の溝をそれぞれ形成し、該複数の溝に弾性シール部材をそれぞれ嵌入してこの複数の弾性シール部材で上記基体と上記蓋体との外周部における間隙を閉塞することを特徴とする容器の封止構造。

【請求項 5】 有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼ L 字形の嵌合段差部を張り出してこの嵌合段差部の内部底面と内周面とには無端状の溝をそれぞれ形成し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設け、上記各溝の弾性シール部材で上記基体と上記蓋体における間隙を閉塞することを特徴とする容器の封止構造。

【請求項 6】 上記複数の弾性シール部材を一体構成した請求項 3 ないし 5 記載の容器の封止構造。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、埃や粉塵等による

汚染を嫌うフォトリソマスク、ペリクル等の精密部品の輸送・搬送用の密封容器に関し、特に半導体シリコンウェーハを汚染から保護して輸送・搬送するための容器の封止構造に関するものである。

【0002】

【従来の技術】 例えば、半導体シリコンウェーハ（以下、単にウェーハと略称する）を収納する従来の容器は、図示しないが、上部が開口した有底筒形の基体と、この基体に収納されるウェーハ用の整列内箱と、基体の開口上部を被覆する蓋体とを備えている。そして、基体に整列内箱を収納後、半導体メーカから IC メーカに航空機や各種車両等で輸送される。

【0003】 ところで、上記構成の容器は、航空機輸送等で環境の気圧が変化した場合、密封状態の保圧性能が不十分なので、比較的短時間で内外の圧力差が緩和され、特に密封状態を解除しなくても開放することができる。しかしながら、これでは、大気中の粉塵が輸送中等に容器に侵入し易く、被収納物であるウェーハのコンタミ (contamination) を惹起することとなる。そこで、この点に鑑み、基体と蓋体との開口部周縁に弾性シール部材を介在させて嵌合する密封構造の容器が開発されている。

【0004】 なお、この種の容器に関する先行技術文献として、実開昭 63-82788 号、実開昭 63-166948 号、特開平 8-279546 号、及び特開平 9-107025 号公報等があげられる。

【0005】

【発明が解決しようとする課題】 しかしながら、近年はウェーハの大口径化（将来的には 300mm 以上と推定される）が進み、これに伴いウェーハを収納する基体及び蓋体も大型化してきている。また、基体と蓋体との開口部周縁に弾性シール部材を介在させて密封性を得る構造では、弾性シール部材の外径を基体及び蓋体の開口部周縁に対応させる必要がある。この場合、当然のことながら、基体及び蓋体の開口部周縁と弾性シール部材との嵌合間隙が大きくなるので、十分な密封性を得ることができないおそれがある。

【0006】 本発明は、上記に鑑みなされたもので、基体と蓋体とが大型化しても簡易な構成で十分な密封性を得ることのできる容器の封止構造を提供することを目的としている。

【0007】

【課題を解決するための手段】 請求項 1 記載の発明においては、上記課題を達成するため、有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼ L 字形の嵌合段差部を張り出してこの嵌合段差部の少なくとも内部底面には無端状の溝を形成し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の少なくとも外周面には無端状の溝を形成し、上記溝にそれぞれ嵌

入された弾性シール部材で上記基体と上記蓋体における間隙を閉塞することを特徴としている。

【0008】また、請求項2記載の発明においては、上記課題を達成するため、有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼL字形的嵌合段差部を張り出してこの嵌合段差部の少なくとも内部底面には無端状の溝を形成し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の少なくとも外周面には無端状の溝を形成し、上記複数の溝に弾性シール部材をそれぞれ嵌入してこの複数の弾性シール部材で上記基体と上記蓋体との外周部における間隙を閉塞することを特徴としている。

【0009】また、請求項3記載の発明においては、上記課題を達成するため、有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼL字形的嵌合段差部を張り出し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の底面と外周面とには無端状の溝をそれぞれ形成し、この溝にそれぞれ嵌入された弾性シール部材で上記基体と上記蓋体における間隙を閉塞することを特徴としている。

【0010】また、請求項4記載の発明においては、上記課題を達成するため、有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼL字形的嵌合段差部を張り出し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設けてこの嵌合筒部の底面と外周面とには無端状の溝をそれぞれ形成し、該複数の溝に弾性シール部材をそれぞれ嵌入してこの複数の弾性シール部材で上記基体と上記蓋体との外周部における間隙を閉塞することを特徴としている。

【0011】また、請求項5記載の発明においては、上記課題を達成するため、有底筒形でほぼドーム形を呈した基体の開口部を蓋体で被覆する容器であって、上記基体の開口部周縁から断面ほぼL字形的嵌合段差部を張り出してこの嵌合段差部の内部底面と内周面とには無端状の溝をそれぞれ形成し、上記蓋体の裏面に該嵌合段差部に嵌合する嵌合筒部を設け、上記各溝の弾性シール部材で上記基体と上記蓋体における間隙を閉塞することを特徴としている。なお、上記複数の弾性シール部材は一体構成することもできる。

【0012】ここで、本発明に係る容器の封止構造は、基体の開口部に蓋体を被せてこれらの周縁部を封止し、内部を密封することのできる容器を対象とする。これら基体と蓋体との間には蓋体の開閉に支障がなく、基体の段差部と蓋体の嵌合筒部とを封止し得る最適な間隙が必要となる。この間隙は、弾性シート部材の材質、形状、つぶし量、及び又は間隙を塞いだ際の基体に対する蓋体の封止力を勘案して決定されるが、0.01mm以上あ

れば、実用的には十分である。具体的には、0.003mm以上～5mmの範囲から選択された適宜の間隙とされる。

【0013】容器は、基体の開口部に蓋体を被せてこれらの周縁部を係止部材で固定し、弾性シール部材を変形させて基体と蓋体との間隙を塞ぐことにより封止される。この封止は、蓋体のリブやハンドル等を使用して蓋体を上方等に取り外すことにより解除される。なお、基体に被収納物を収納して蓋体を被せる方法が一般的であるが、これに限定されるものではない。例えば、蓋体の底面に被収納物を収納するようにして蓋体の開口部に基体をセットし、蓋体の嵌合筒部と基体の嵌合段差部との間隙を封止して密着しても良い。また、特許請求の範囲における「ほぼドーム形を呈した基体」とは、半球球形に限らず、有底円筒形や角柱形等の各種形状を呈した中空の基体をいう。

【0014】「断面ほぼL字形」には、厳密な意味の断面L字形の他、おおよそ断面L字形と認められる類似形状をも含む。また、溝は、特許請求の範囲に記載した各面にエンドレスに、具体的には、環状、無端状、又は棒状等に形成される。溝は、最低限上記各面に形成されるが、基体の嵌合段差部の内周面と蓋体の嵌合筒部の底面、あるいは基体の嵌合段差部の内部底面と内周面とにさらに形成されれば、容器内部の密封性ととも蓋体の係止効果を奏する。すなわち、基体の嵌合段差部の内部底面と蓋体の嵌合筒部の外周面、あるいは蓋体の嵌合筒部の底面と外周面から膨出している弾性シール部材が対応する上記各面の溝に嵌まって密着すると、蓋体が基体から外れにくくなり、封止効果に加え、より確実な係止固定が期待できる。

【0015】弾性シール部材は、その形状や構造等を特に限定するものではないが、エンドレスで中空又は中実の構造が好ましい。特に、チューブ状の弾性シール部材は、その材質自体の硬度が比較的高い場合でも、形状的に圧縮力を低くすることができるので、非常に有効である。また、弾性シール部材は、容器の内部の圧縮性や密閉性の観点から柔軟性や弾力性に富む材質であることが重要である。このような材質としては、熱可塑性エラストマー、フッ素樹脂系のゴム、又は各種のゴム材等が該当する。特に、ゴム硬度で40度以下のシリコンゴムは、圧縮永久歪みが小さいので、好ましい材質といえる。

【0016】なお、弾性シール部材は、2個使用するのが一般的であるが、3個以上使用して密封性をさらに向上させることも可能である。この複数使用する場合、可能であれば、複数の弾性シール部材を一体化しても良い。さらに、弾性シール部材は、作業時に溝に嵌められるものでも良いし、溝に接着剤や粘着剤等を介し予め固定された構成でも良い。

【0017】

【発明の実施の形態】以下、図面を参照して本発明の第1の実施形態を説明する。本実施形態における容器は、図1や図2に示すように、基体1の開口上部を蓋体5で嵌脱自在に被覆するようにしている。

【0018】基体1は、機械的特性、汚染性、及び成形性に優れた合成樹脂を用いて透明な有底円筒形・ドーム形に成形され、図示しないウェーハ用の整列内箱を収納するよう機能する。この基体1の開口上部の周縁には断面ほぼ階段形の嵌合段差部2が半径外方向に水平に張り出し成形され、この嵌合段差部2の内部底面（水平面）には断面半円形の溝3が環状に凹み成形されており、この溝3には環状で中実の弾性シール4が着脱自在に嵌合装着される。この弾性シール4は、その表面下部が溝3に嵌入接触し、残部が膨出する。なお、整列内箱は、図示しないが、中空の円柱形に成形され、水平状態のウェーハを隙間を介し上下方向に並べて複数（例えば25枚）収納する。

【0019】蓋体5は、機械的特性、汚染性、及び成形性に優れた合成樹脂を用いて円板形に成形され、その裏面からリング形で少々縮径の嵌合筒部6が図1の下方向に向け突出成形されている。この嵌合段差部2の外周面（垂直面）には断面半円形の溝7が環状に凹み成形され、この溝7には環状で中実の弾性シール8が着脱自在に嵌合装着される。この弾性シール8は、その表面一側が溝7に嵌入接触し、残部が膨出する。

【0020】上記構成において、容器を封止するには、基体1の開口上部に蓋体5を被せて嵌合し、これらの外周縁を図示しない複数の係止片でそれぞれ固定すれば良い。すると、一対の弾性シール4・8がそれぞれ押圧変形し、嵌合段差部2の内部底面と嵌合筒部6の外周面との間隙が完全に閉塞され、容器の内部が密閉される。

【0021】上記構成によれば、弾性シール4・8がそれぞれ圧縮変形して嵌合段差部2と嵌合筒部6との間隙を完全に閉塞するので、ウェーハが300mm以上となり、基体1と蓋体5が大型化されても、十分な密封性を得ることができる。

【0022】なお、本実施形態では作業時に溝3に弾性シール4を、溝7には弾性シール8をそれぞれ嵌合装着するものを示すが、なんらこれに限定されるものではない。例えば、作業前に溝3・7に弾性シール4・8を予め嵌合接着した構成としても良い。

【0023】次に、図3及び図4は本発明の第2の実施形態を示すもので、この場合には、嵌合段差部2の溝3を省略し、蓋体5の嵌合筒部6における底面（水平面）と外周面（垂直面）とに断面半円形の溝9・10をそれぞれ環状に凹み成形し、各溝9・10に環状・中実の弾性シール11・12を着脱自在に嵌合装着して基体1と蓋体5との外周縁における間隙を複数の弾性シール11・12で閉塞するようにしている。その他の部分については、上記実施形態と同様であるので説明を省略する。

本実施形態においても、上記実施形態と同様の作用効果が期待できるのは明らかである。

【0024】なお、本実施形態では作業時に溝9に弾性シール11を、溝10には弾性シール12をそれぞれ嵌合装着するものを示すが、なんらこれに限定されるものではない。例えば、作業前に溝9・10に弾性シール11・12を予め嵌合接着した構成としても良い。また、大きさの異なる2本の弾性シール11・12を別々に使用するものを示したが、図5に示すように、2本の弾性シール11・12を一体成形して単一化を図るようにしても良い。このように一体成形すれば、弾性シール11・12の紛失のおそれがなく、しかも、部品点数の削減が可能となる。

【0025】次に、図6及び図7は本発明の第3の実施形態を示すもので、この場合、基本的な構成は図1や図2と同様であるが、基体1の嵌合段差部2における内部底面（水平面）と内周面（垂直面）とに断面半円形の溝13・14をそれぞれ環状に凹み成形するとともに、蓋体5の嵌合筒部6における底面（水平面）と外周面（垂直面）とに断面半円形の溝15・16をそれぞれ環状に凹み成形し、各溝13・16に環状・中実の弾性シール17・18を着脱自在に嵌合装着して基体1と蓋体5との外周縁における間隙を複数の弾性シール17・18で閉塞するようにしている。したがって、基体1の溝14は蓋体5の弾性シール18を、蓋体5の溝15は基体1の弾性シール13をそれぞれ密嵌状態で收容する。その他の部分については、上記実施形態と同様であるので説明を省略する。

【0026】本実施形態においても、上記実施形態と同様の作用効果が期待でき、しかも、溝13・14・15・16に弾性シール17・18が完全に嵌入して密着されるので、容器の内部が確實強固に密閉されるとともに、基体1から蓋体5が非常に外れにくくなり、蓋体5の係止固定がより確実となる。

【0027】なお、上記実施形態では嵌合筒部6の底面と外周面とに溝15・16をそれぞれ凹み成形し、基体1の嵌合段差部2の溝を省略したものを示したが、逆でも良い。すなわち、蓋体5の嵌合筒部6の溝15・16を省略し、基体1の嵌合段差部2のみに溝13・14をそれぞれ凹み成形するようにしても良い。また、この場合、大きさの異なる2本の弾性シールを一体成形して単一化を図ることができる。また、上記実施形態ではウェーハ用の容器を示したが、なんらこれに限定されるものではない。例えば、電気、電子、又は半導体の製造分野で使用されるアルミディスク、液晶セル、石英ガラス、又はマスク基板等を容器に直接間接に収納するようにしても良い。さらに、上記分野以外の他分野の被収納物を収納するようにしても良い。

【0028】

【発明の効果】以上のように請求項1ないし5記載の発

明によれば、基体と蓋体とが大型化しても簡易な構成で十分な密封性を得ることができるという効果がある。さらに、請求項 6 記載の発明によれば、弾性シール部材の管理や保管が容易となり、しかも、部品点数を削減することが可能になる。

【図面の簡単な説明】

【図 1】本発明に係る容器の封止構造の実施形態における封止前の状態を示す断面説明図である。

【図 2】本発明に係る容器の封止構造の実施形態における封止後の状態を示す断面説明図である。

【図 3】本発明に係る容器の封止構造の第 2 の実施形態における封止前の状態を示す断面説明図である。

【図 4】本発明に係る容器の封止構造の第 2 の実施形態における封止後の状態を示す断面説明図である。

【図 5】本発明に係る容器の封止構造の実施形態における弾性シールの他の例を示す平面図である。

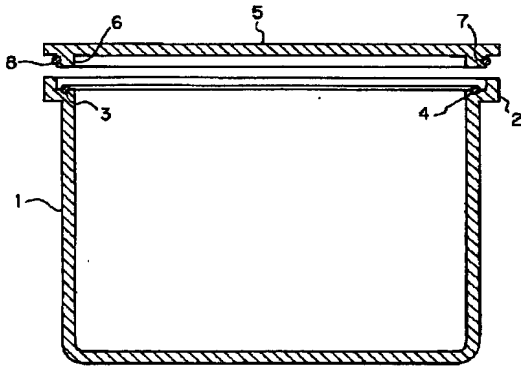
【図 6】本発明に係る容器の封止構造の第 3 の実施形態における封止前の状態を示す断面説明図である。

【図 7】本発明に係る容器の封止構造の第 3 の実施形態における封止後の状態を示す断面説明図である。

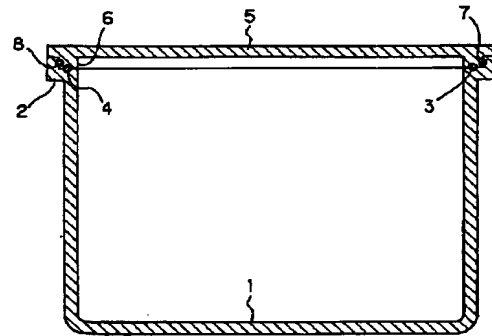
【符号の説明】

- | | |
|----|----------------|
| 1 | 基体 |
| 2 | 嵌合段差部 |
| 3 | 溝 |
| 4 | 弾性シール（弾性シール部材） |
| 5 | 蓋体 |
| 6 | 嵌合筒部 |
| 7 | 溝 |
| 8 | 弾性シール（弾性シール部材） |
| 9 | 溝 |
| 10 | 溝 |
| 11 | 弾性シール（弾性シール部材） |
| 12 | 弾性シール（弾性シール部材） |
| 13 | 溝 |
| 14 | 溝 |
| 15 | 溝 |
| 16 | 溝 |
| 17 | 弾性シール（弾性シール部材） |
| 18 | 弾性シール（弾性シール部材） |

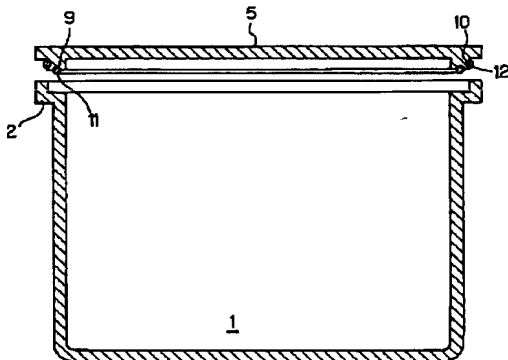
【図 1】



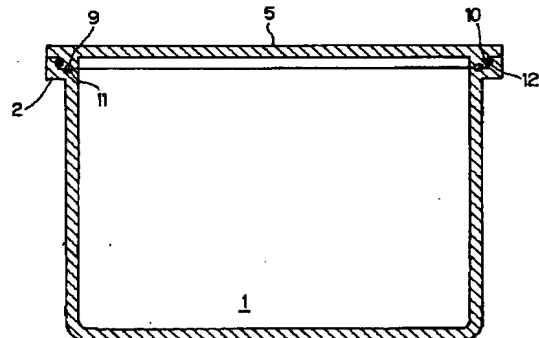
【図 2】



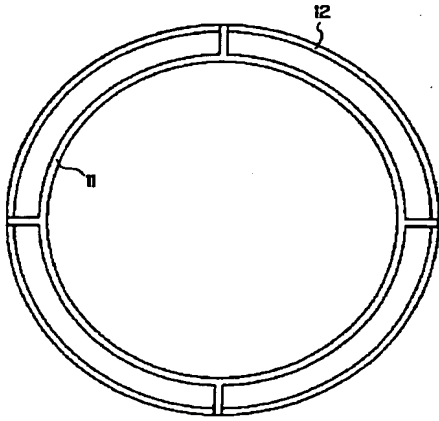
【図 3】



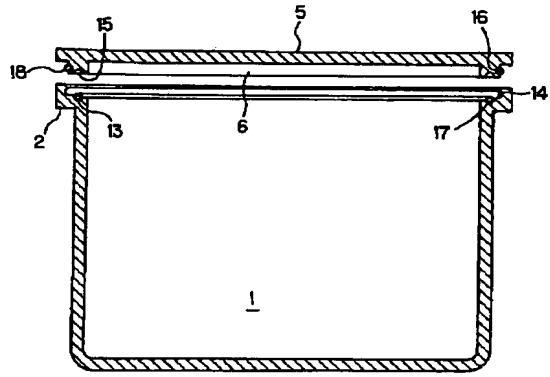
【図 4】



【図 5】



【図 6】



【図 7】

